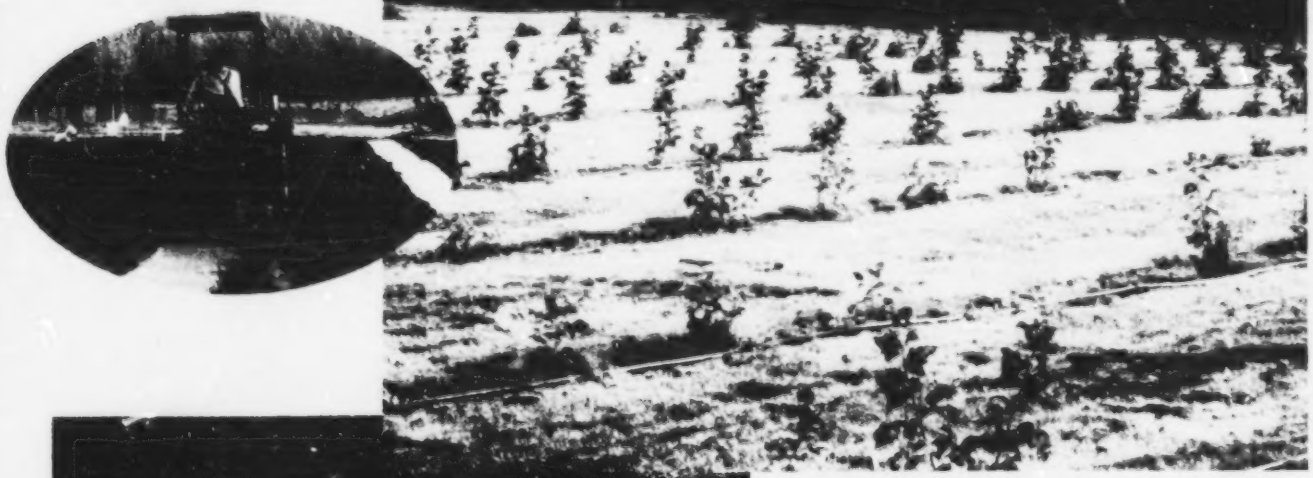
YUKON AGRICULTURE RESEARCH AND DEMONSTRATION REPORT

Field Season 2000



Yukon
Renewable Resources
Agriculture Branch

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Yukon Agriculture
Research and Demonstration Report

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Progress Report
2000 Field Season

Executive Summary

Takhini Forestry Farm Demonstration Plot

The 2000 growing season was the second year in a four-year grain maturity trial undertaken at the Takhini Forestry Farm. The purpose of this trial is to measure the economics of production and management inputs required to mature grain in southern Yukon. A horticultural cash crop of potatoes was also grown at the Forestry Farm to test different varieties and determine profitability.

The agroclimatic rating for the 2000 growing season at the Forestry Farm was Class 5 – which falls in the 30-year normal classification for this area. A total of 20% fewer growing degree days were recorded for the 2000 season as compared to last year. Temperatures were below normal and the Takhini valley received a 36% increase in total precipitation. All this resulted in a poor year for grain crop yields, but excellent horticultural crops for the cool season.

This year's horticulture cash crop consisted of "Norland" potatoes. The wet soil conditions were optimal for the early potato variety resulting in the most mature and lucrative crop of potatoes grown at this site in all six years. The 2000 net return for potatoes was $14,989.92/ha.

The barley crop was grown for 140 days. The barley plot produced a marketable harvest of 2.22 tonne/ha. At a local selling price of $298.00/tonne, this produced a net loss of $-27.37/ha.

The wheat plot produced a marketable harvest of 0.96 tonne/ha. At a local selling price of $310.00/tonne, the net loss was $-394.42/ha. The wheat harvested would barely suffice for feed – it was very poor seed quality due to the immaturity of the crop.

The oat plot was sampled on September 28th when the oat grain was in the milk to soft dough stage of maturity. This plot produced a marketable harvest of 3.36 tonne/ha. At a local selling price of $302.00/tonne, the net return was $368.61/ha.

Small Fruit Trials

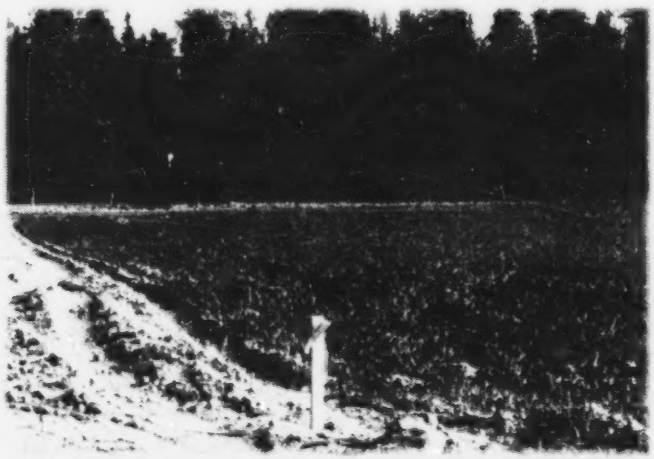
The summer of 2000 was the third growing season in a multi-year raspberry variety trial undertaken at a farm located on the north side of the Takhini River. The purpose of the trial is to test the commercial viability of raspberry varieties using various soil amendment techniques. Soil reaction to the various amendments is being recorded together with the economic input, which will provide an estimate of the commercial value of the amendments.

The winter of 1999/00 provided an opportunity to measure raspberry variety winter hardiness under extreme conditions. With the loss of the snow cover during late December, the previous years growth on all varieties except Kiska was killed back to the

ground. At the time of the first assessment on June 21, all varieties showed extensive suckering and re-growth from the roots. Kiska displayed 20-30% die-back on the previous years growth and had started to flower on the remaining portion of the live floricanes.

On August 31, the final variety assessment was conducted. Kiska displayed the most plant vigour, both in terms of plant re-growth and as the only variety to produce fruit. The Boyne variety slipped to second place this year due to the extensive winterkill of the previous years growth. Boyne was second best in terms of vegetative re-growth. Of the primocane varieties, Red River never thrived or produced fruit in the trial, as a result Red River will be dropped from the trial in 2001. Double Delight will stay in the trial as it continues to show good vegetative growth, but has not yet produced mature fruit on first year canes in the southern Yukon. Souris will be consolidated from three rows into two in 2001 as it ranks third in vigour for the floricane varieties and room needs to be made for two new varieties. Honey Queen will continue to be evaluated to see how often fruit will mature in the short Yukon growing season.

At the beginning of the 2000 growing season, six varieties of strawberries were planted to be tested for their viability in the southern Yukon. The varieties tested were Bounty, Cavendish, Gooscap, Honeyoye, Kent and Toklat. Input on trial design and mulching techniques was provided from a commercial producer near Fairbanks. On June 1st, 12 rows were planted with 3 meter spacing between the rows and 45 cm spacing between each plant. Infrared transmissive plastic mulch was laid over each planting bed with the hope that this mulch would allow soil warming while effectively controlling weed growth. Within three weeks of transplanting, several of the plants had died or showed signs of stress with a resulting loss of some plants. Cavendish was the healthiest and most productive of the varieties, followed closely by Goosclap. Toklat is a variety grown in Alaska and proved successful in the test plots, but the stock was limited and a full trial will be initiated next year.



Germinating crop of oats at the Takhini Forestry Farm

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Site 1: TAKHINI FORESTY FARM DEMONSTRATION PLOT

The 2000 growing season marked the second year in a four-year grain maturity trial undertaken at the Takhini Forestry Farm. The grain trial looks at the performance of different early maturing varieties, grown under irrigated conditions and with various production methods used to improve variety performance in this area. The purpose of this trial is to measure the economics of production and management inputs required to mature grain in the southern Yukon.

A cash crop of potatoes was also grown at the Forestry Farm to test different varieties and determine profitability. This section of the report describes the 2000 field season and the overall findings of the grain maturity and cash crop trials.

Site Description

Agrometeorology

Climate is the major limiting factor to agriculture in the Yukon because of the short frost free period and lack of heat units during the growing season. Agroclimatic capability ratings are a measure of the degree of limitation imposed by climate on agricultural production. These ratings are derived from 30-year normal data collected by Atmospheric Environment Services of Environment Canada. They represent a measure of the amount of heat available to crops during the growing season. The agroclimatic rating is modified to account for local climate patterns, such as frost occurrences, which affect the length of the growing season. As shown on table 1, agroclimatic classes range from Class 1 (no restrictions) to Class 7 (unable to be used for any agricultural purpose).

A field of barley in the Takhini Valley

Table 1
Definitions and Operational Constraints of Land Capability Classes for Cultivated Agriculture in Yukon Territory (Tarnocai et al. 1988)

Class 1 1400-1600 GDD	These lands have no significant limitations that restrict the production of the full range of common Canadian agricultural crops (none in Yukon).
Class 2 1200-1400 GDD	These lands have slight limitations that restrict the range of some crops but still allow the production of grain and warm season vegetables (none in Yukon, based on a 30 year average).
Class 3 1050-1200 GDD	These lands have moderate limitations that restrict the range of crops to small grain cereals and vegetables (in a few localized areas in Yukon).
Class 4 900-1050 GDD	These lands have severe limitations that restrict the range of crops to forage production, marginal grain production and cold-hardy vegetables (valleys of central Yukon).
Class 5 700-900 GDD	These lands have very severe limitations that restrict the range of crops to forages, improved pastures and cold-hardy vegetables (the most common class of agricultural land in Yukon).
Class 6 <700 GDD	These lands have such severe limitations for cultivated agriculture that cropping is not feasible. These lands may be suitable for native grazing.
Class 7	These lands have no capability for cultivated agriculture or range for domestic animals.

The number of growing degree days (GDD) are calculated beginning the fifth consecutive day with mean temperatures above 5°C, and terminated the day following the first killing frost (-2.2°C) which occurs after mid-July. During the 2000 growing season, the weather station at the Takhini test plot recorded 664.7 growing degree days. When corrected for latitude, this becomes 784.4 effective growing degree days (EGDD). The first killing frost occurred on Aug 29th. The agroclimatic rating for 2000 was Class 5 (700-900 EGDD), which is one class too low for the maturation of oats, barley and rye. This rating is lower than that for the last two years, but falls in line with the normal rating for this area. (See table 2)

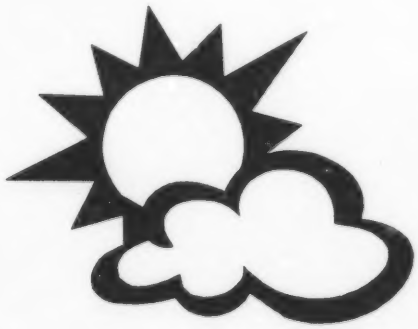


Table 2
Agroclimatic Data for the 2000 Growing Season at the Takhini Test Plots

Climate Factor	May	June	July	August	Total
Max Temp (°C)	18.4	26.4	35.0	27.5	
Min Temp (°C)	-7.3	-3.6	0.6	-2.7	
Daily Mean (°C)	6.4	12.4	13.6	10.6	
30 Year Normal	6.7	12.0	14.1	12.5	
Total Precipitation (mm)	20.3	19.5	40.6	98.8	179.2
30 Year Normal	12.9	30.7	33.6	37.9	115.1
Growing Degree Days (>5°C)	11.3	222.5	267.3	163.6	664.7
Effective Growing Degree Days	13.4	262.5	315.4	193.1	784.4 *
Frost Free Period (0°C)		June 22	→	Aug 10	50 days **
Killing Frost Free Period (-2.2°C)		June 22	→	Aug 28	68 days

* The temperature factor is adjusted upward by 18% to account for the boost plants receive from the long hours of daylight north of 60° latitude.
** Whitehorse Airport records a 30-year mean frost free period of 87 days. This is longer than the 2000 frost free period and most others recorded at the Forestry Farm. The airport site regularly receives winds which tend to keep the temperature above freezing, while the forest sheltered nature of the Takhini Valley site reduces air movement, and therefore frosts are more common.

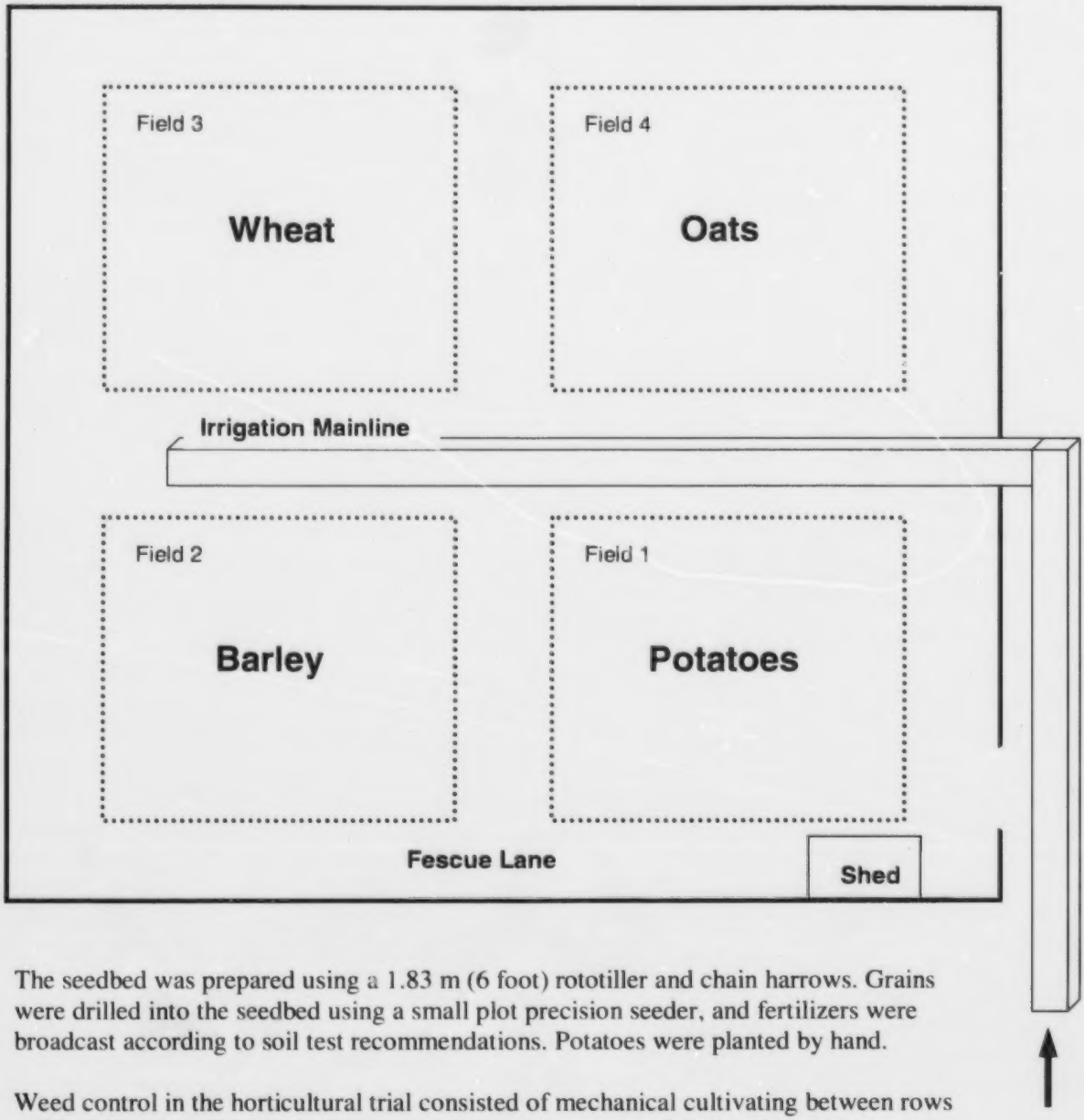
Site Preparation and Plot Design

The agriculture test plots are located at the Federal Forestry Farm situated south of the junction of the Klondike Highway and the Takhini Hotsprings Road. The demonstration plots are located on a level, sheltered 0.98 hectare field which is divided into four 40 m x 35 m test plots (Figure 1). All crops are grown under irrigated conditions. The soil, landscape and climatic properties of the site are typical of those encountered at many farms in the southwest region of the Yukon.

Soils

The fine textured soils at the demonstration plot vary from silt loam to sandy loam, and their potential for agricultural production is rated as fair to good. These soils belong to the Lewes soil association and are characterized as loam, with an average particle size breakdown of 42% sand, 47% silt and 11% clay throughout the four fields. The average soil pH of the three plots this year was 6.9, and the average soil organic matter was 2.3% up 25% from 1999 due to an intensive soil building program from 1994-98.

Figure 1
Takhini Forestry Farm Plot Layout 2000



The seedbed was prepared using a 1.83 m (6 foot) rototiller and chain harrows. Grains were drilled into the seedbed using a small plot precision seeder, and fertilizers were broadcast according to soil test recommendations. Potatoes were planted by hand.

Weed control in the horticultural trial consisted of mechanical cultivating between rows and hand roguing. Weeds in the crop rows were also removed by hand roguing.

Trial Description and Results

Horticulture Trial

Field 1: Potatoes

In 2000, the horticulture trial consisted of seeding of "Norland," an early red skinned potato variety (see appendix A). The purpose of the trial was to measure the performance of this particular variety and the economics of production on a per acre basis as compared to the previous year.

On May 24th, six 30 meter rows of "Norland" potatoes where planted with 30 cm spacing between plants. The "Norland" potato variety had an above average yield last year, and this year proved even more lucrative. Overall, the trial yield exceeded our expectations due to the consistent soil moisture levels provided by a cool, wet summer.

Table 3
Horticulture Crops – Potatoes

Plot Design	35 x 40 m
Seedbed Preparation	Spring rototilling
Fertilizer Application	137-118-141 kg/ha (122-105-126 lb/ac)
Seed Variety	Norland
Seeding Date	May 24, 2000
Planting Methods	Hand
Harvest Date	September 14, 2000
Soil Test Date	September 27, 2000
pH	7.0 – neutral
Organic Matter	2.4% – normal

The potatoes were fertilized according to soil test recommendations. Irrigation of the horticulture plots occurred five times between June 7th and August 4th, this is a significant decrease in irrigation due to the wet weather this past year. The potatoes were hit with a hard frost (-3.6°C) on June 21st, which damaged some of the new growth but did not kill any plants.

Table 4
2000 Horticulture Harvest Results - Potatoes
Cost and Return Summary

Cost:	
Certified Seed	$2,609.59/ha
Fertilizer	$604.91/ha
Irrigation	$259.00/ha
Fuel and Equipment	$429.78/ha
Labour	$1,580.00/ha
Total Cost *	$5,483.28/ha
Return:	
Total Harvest	25,850 kg/ha
Cull and Undersize	10%
Marketable Harvest	23,265 kg/ha
Selling Price	$0.88/kg
Gross Return	$20,473.20/ha
Net Return	$14,989.92/ha

*This cost excludes washing, grading and marketing.

The continuously damp soil conditions, the late killing frost and the planting of an early potato variety resulted in the most mature crop of potatoes grown at this site in five years, even surpassing last years record numbers. Horticulture harvest results and economics are presented in Table 4 above.

Cereal Maturity Trials

The purpose of this trial is to compare the growth and yield of wheat, barley and oats grown in southern Yukon, to the growth and yield of the same crops grown in central Yukon using the same crop inputs. The central Yukon trial, conducted from 1995 to 1998, demonstrated the need for irrigation to produce grain on a consistent basis (Hill and Sproule 1999). The trial initiated in 1999 in southern Yukon was also conducted under irrigated conditions. Early maturing varieties of grain were used and seeding was done as early as weather permitted to determine how consistently grain could be matured in the cooler southern climate.

The summer of 2000 provided close to 20% fewer growing degree days than in 1999, which put the agroclimatic rating below the normal requirement for spring seeded cereal grains. This resulted in a net loss of revenue for both barley and wheat, with a small return made on the oat crop.

Field 2: Barley

The barley plot was seeded on May 11th and due to the cool, wet conditions the crop was not irrigated for the first time until May 25th and then only once more in mid-June. On June 27th, 2-4D herbicide was applied to the plot with ground spraying equipment in an attempt to control an infestation of narrow leaf hawksbeard (*Hieracium scabriusculum)* and other broadleaf weeds. This spraying date was 11 days later than in 1999, at the same stage of crop growth, even though the seeding date was the same (May 11) both years. As in 1999, the herbicide was effective on all the broadleaf weeds with the exception of the hawksbeard, which was stunted but not killed.

Table 5
Grain Trial – Barley

Plot Design	35 x 40 m
Seedbed Preparation	Spring rototilling
Fertilizer Application	39-96-36 kg/ha (35-86-32 lb/ac)
Seeding Rate	78 kg/ha (70 lb/ac)
Seeding Method	Precision Plot Seeder
Seeding Date	May 11, 2000
Seed Variety	AC Albright
Soil Test Date	September 27, 2000
pH	6.6 – neutral
Organic Matter	2.6% – normal

The barley seeded was a six row general purpose variety called "AC Albright" (see appendix B). This variety was noted for its early maturity and was recommended for our area by both Alberta Agriculture and the University of Alaska, Fairbanks. The seeding rate was 78 kg/ha and fertilizer was applied according to the recommended practice for grain maturity. Soil samples were taken from each plot the previous fall.

The barley crop was grown for 140 days from time of seeding to time of sampling which occurred on September 28th. Crop conditions were never ideal for harvest due to the cool, wet weather and immature grain. The crop was randomly sampled twice using a 0.5 m^2 frame. The barley grain was not dry enough to store directly and when the samples were dried and weighed, produced 2220 kg/ha or 47 bushels of grain per acre at a bushel weight of 42 pounds (Table 6).

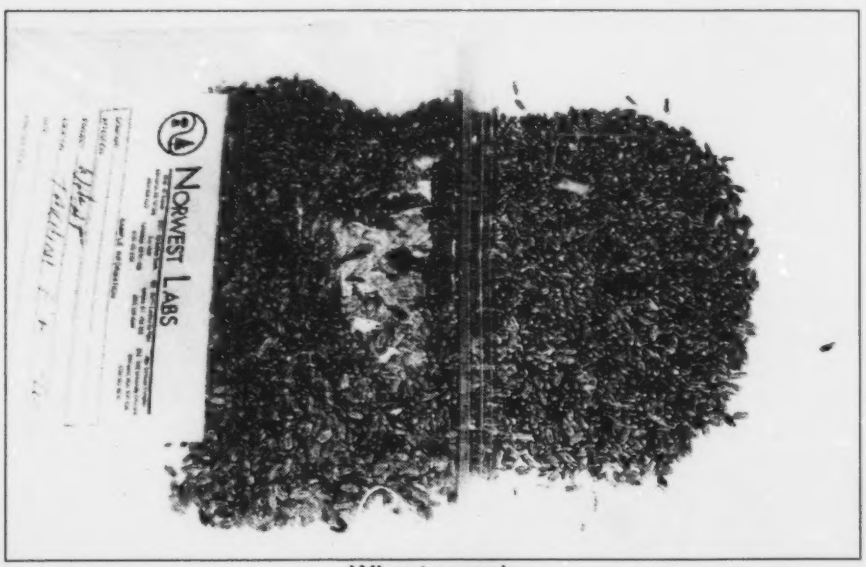
Weighing grain samples

Table 6
2000 Barley Harvest Results – Cost and Return Summary

Cost:	
Seed Cost	$46.95/ha
Fertilizer	$197.19/ha
Operating Costs (labour, depreciation, irrigation)	$407.72/ha
Herbicide	$37.07/ha
Total Cost	$688.93/ha
Return:	
Marketable Harvest	2.22tonne/ha
Selling Price	$298.00/tonne
Gross Return	$661.56/ha
Net Return (Loss)	$(-27.37)/ha

Field 3: Wheat

The wheat plot was seeded on May 11th and irrigated one week later (Table 7). Approximately 100 mm of irrigation water was applied in two sets once in mid-June and once at the end of that month. On June 27th, 2-4D herbicide was applied to the plot with ground spraying equipment in an attempt to control an infestation of narrow leaf hawksbeard (*Hieracium scabriusculum*) and other broad leaf weeds. Results were the same as reported in the barley plot.



Wheat sample

Table 7
Grain Trial – Wheat

Plot Design	35 x 40 m
Seedbed Preparation	Spring rototilling
Fertilizer Application	39-96-36 kg/ha (35-86-32 lb/ac)
Seeding Rate	94kg/ha (84 lb/ac)
Seeding Method	Precision Plot Seeder
Seeding Date	May 11, 2000
Seed Variety	AC Minto
Soil Test Date	September 27, 2000
pH	6.9 – neutral
Organic Matter	1.8% – low

The variety of wheat seeded was a hard red spring type named "AC Minto" (see appendix B). Characteristics of growth are intermediate height, with fair shattering resistance and maturity similar to Neepawa. Seeding rate was 94 kg/ha, and fertilizer was applied according to recommended practice for grain maturity.

The wheat grain never reached a reasonable level of maturity and would have probably only been harvested for straw or plowed under. Sampling occurred on September 28th when frost had stopped any further ripening. The grain harvested was very poor seed quality and would have been marginal for feed. It would have also required drying if it was to be stored and not kept in a frozen state. Yields were very poor at 960 kg/ha or 27 bushels per acre with a bushel weight of 32 pounds (Table 8).

Table 8
2000 Wheat Harvest Results – Cost and Return Summary

Cost:	
Seed Cost	$50.04/ha
Fertilizer	$197.19/ha
Operating Costs (labour, depreciation, irrigation)	$407.72/ha
Herbicide	$37.07/ha
Total Cost	$692.02/ha
Return:	
Marketable Harvest	0.96 tonne/ha
Selling Price	$310.00/tonne
Gross Return	$297.60/ha
Net Return (Loss)	$(-394.42)/ha

Field 4: Oats

The oat plot was seeded on the same day as the other cereals, May 11th (Table 9). Irrigation began on this plot on May 23rd and ended on June 20th with three sets of water

being applied at approximately 40 mm per set. No herbicide was used to control weeds on this plot.

Table 9
Grain Trial – Oats

Plot Design	35 x 40 m
Seedbed Preparation	Spring rototilling
Fertilizer Application	39-96-36 kg/ha (25-86-32 lb/ac)
Seeding Rate	67 kg/ha (60 lb/ac)
Seeding Method	Precision Plot Seeder
Seeding Date	May 11, 2000
Seed Variety	AC Mustang
Soil Test Date	September 28, 2000
pH	7.0 – neutral
Organic Matter	2.2% – normal

The variety of oats planted was "AC Mustang" (see appendix B). This is the third year of trials with this variety in different areas of the Yukon. Yields in both forage and grain production trials in Alberta were as much as 117% of the "Cascade" variety, which had been the best producing oat in previous Yukon Crop Trials. Our results have been mixed. Although Mustang produced a taller crop, producers reported the greenfeed to be less palatable to horses. So far, grain production appears to be inconclusive, with quality and yield being widely variable.

By the end of August, the oat grain was in the milk to soft dough stage of maturity. Sampling occurred on September 28th when no further ripening was likely to occur. Yields were lower than last year in this area but still high enough to be profitable at 3,360 kg/ha or 90.6 bushels of grain per acre at a 33 pound bushel weight (Table 10).

Table 10
2000 Oat Harvest Results – Cost and Return Summary

Cost:	
Seed Cost	$41.39/ha
Fertilizer	$197.19/ha
Operating Costs (labour, depreciation, irrigation)	$407.72/ha
Herbicide	$0.00/ha – none applied
Total Cost	$646.30/ha
Return:	
Marketable Harvest	3.36 tonne/ha
Selling Price	$302/tonne
Gross Return	$1,014.72/ha
Net Return	$368.42/ha

Site 2: SMALL FRUIT TRIALS

Introduction

The summer of 2000 marked the third growing season for the raspberry variety trial and the first year of a new trial to test the growth of six strawberry varieties. The cooperators in the trial are interested in determining the commercial viability of each variety and what soil amendments can be made on this particular site to optimize crop production. Monitoring of soil reaction to the various amendments combined with on site weather data will help to assess environmental factors in variety performance. In the long term, practical data on the commercial production of raspberries and strawberries in the Yukon's main agricultural belt will be available to the industry.

Site Description

Both the strawberry and raspberry trials are located on a gently sloping, south facing terrace within 225 meters of the Takhini River. Soils at the trial site are mainly silt/loam, pH is alkaline, averaging above 8.0, and salinity levels range from moderately saline (electrical conductivity (EC) 4-8 dS/m) in the spring to slightly saline (EC 1.5 dS/m) later in the summer.

Weather at the site in the summer of 2000 was both wet and cold. Average temperatures were below normal for three out of the four months on record and a 36% increase in precipitation was recorded over the summer. A total of 784.4 effective growing degree days were recorded for the 2000 summer.

A five centimeter (2 inch) electric pump is used to deliver water 225 m to the test site through a five cm (2 inch) polyethylene mainline. Water is distributed to each row through drip lines from the main.

Preparing the plot for the raspberry trial in 1998

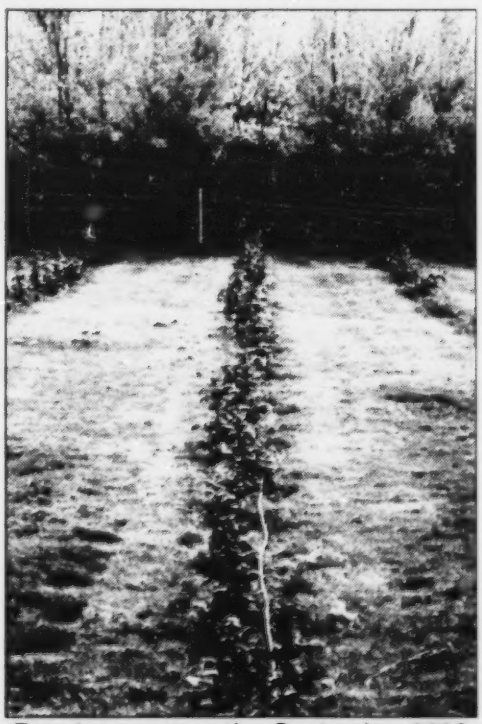
Raspberry Variety Trials

The summer of 2000 marks the third year in a five year trial to assess the commercial viability of six raspberry varieties. Varieties included Boyne and Souris, two Agriculture Canada varieties widely grown in the west; Red River and Double Delight, two primocane varieties recently released by Agriculture Canada; Kiska, a native cross developed in Alaska; and Honey Queen, a yellow raspberry from Rocky Mountain House in Alberta (see appendix C). Plant spacing was 0.91 m (3 feet) between plants and 0.91 m (3 feet) between rows, with 3 m (10 feet) grassed mowing strips between the varieties. Three rows of each raspberry variety were planted for a total of 18 rows.

During site preparation in 1998, an attempt was made to lower soil pH using 0-0-0-90s, sulpher granules. Soil tests taken that fall and again in the spring of 1999 revealed no change in pH. The lack of acidification at this site can be explained by the presence of free lime (calcium carbonate) which counteracts the acidification caused by the sulpher granules. Consequently, soil pH was not reduced as hoped, and some of the plants (Honey Queen in particular) displayed nutrient deficient symptoms consistent with alkaline soil conditions.

In the spring of 2000, a more localized approach to lowering soil pH and delivering nutrients to the plants was taken. In late May, each row received a complete granular fertilizer application including 24% sulphur. Two weeks later, a program of liquid fertilization began using an acidifying fertilizer both as a soil drench and foliar application. Soil tests were taken directly from the rows on June 21 revealing a more neutral pH of 7.4 and optimum fertility levels.

The winter of 1999/00 provided an opportunity to assess the winter hardiness of each variety under extreme conditions. Late in December 1999, unseasonably warm temperatures melted the snow cover that had been in place for the previous two months. While temperatures soon returned to normal, the snow cover did not return in insulating quantities until March, leaving the previous seasons growth exposed to cold, drying winds for the coldest months of winter. The previous years growth on all varieties except Kiska, was killed back to the ground. At the time of the first assessment on June 21, all varieties showed extensive suckering and re-growth from the roots. Kiska displayed 20-30% die-back on the previous years growth and had started to flower on the remaining portion of the live floricanes.



Raspberry regrowth - September 2000

On August 31, the final variety assessment was conducted. Kiska displayed the most plant vigour, both in terms of plant re-growth and as the only variety to produce fruit. The Boyne variety slipped to second place this year due to the extensive winterkill of the previous years growth. Boyne was second best in terms of vegetative re-growth. Of the primocane varieties, Red River never thrived or produced fruit in the trial, as a result Red River will be dropped from the trial in 2001. Double Delight will stay in the trial as it continues to show good vegetative growth, but has not yet produced mature fruit on first year canes in the southern Yukon. Souris will be consolidated from three rows into two in 2001 as it ranks third in vigour for the floricane varieties and room needs to be made for two new varieties. Honey Queen will continue to be evaluated to see how often its fruit will mature in the short Yukon growing season.

Two new varieties of raspberry developed by the Department of Plant Science, University of Saskatchewan are scheduled to be introduced to the trial in 2001. Both varieties are reported to be hardier than Boyne with superior fruit quality. Whether or not mature fruit can be produced in the Yukon will be of critical importance. Detailed descriptions of the new introductions, SK Red Mammoth and SK Red Bounty are included in the appendix.

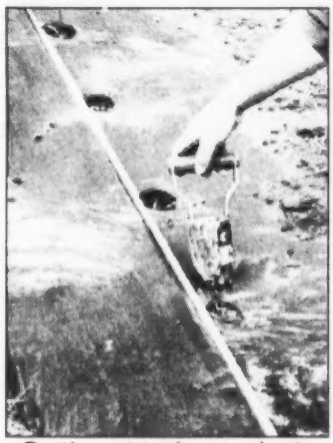
Strawberry Variety Trial

Of the six varieties of strawberries selected for trial on this site, five are commercially grown in other parts of Canada and the other variety, Toklat, is grown in Alaska. Input on trial design and mulching techniques was provided by a commercial producer near Fairbanks, Alaska.

Laying the IRT mulch

The site selected for the trial is located 15 m to the west of the established raspberry orchard. Through May, the site was cleared and rototilled in preparation for planting. On June 1st, twelve planting rows, 26 meters in length by one meter wide, were laid out with

three meters between each row to facilitate mechanical weed control. Three pounds (1.36 kg) of complete granular fertilizer was applied to each planting bed with an analysis of 31-51-60-(22s). Following the installation of drip irrigation lines, a one meter wide (3 ft) infrared transmissive plastic mulch (IRT) was laid over each planting bed . The wave selective mulch was designed to allow soil warming while eliminating certain spectrums of light so that it was also effective at controlling weed growth. This mulch, widely used in Alaska, also provided a clean surface for the berries to develop on. Strawberry plants were then manually transplanted in the center of each row 45 cm (18 inches) apart, using bulb planters to cut through the mulch. The transplants each received ½ liter of 30-10-10 liquid fertilizer one week after planting.



Setting strawberry plants through the IRT mulch

Within three weeks of transplanting, several of the transplants had died or were showing signs of stress. A soil test was taken on June 21, in the areas worst affected to determine whether salinity or fertilizer toxicity may have been the cause. The results of the soil test showed a decrease in salinity from the one taken prior to planting in May and near optimum levels of plant nutrients. It was determined that some of the planting stock may have been dehydrated prior to transplanting and would have taken better if it had been re-hydrated before setting in the field.

The first assessment of the trial took place on July 21 and the final assessment was performed on August 31, 2000. The results are presented in table 11.

It is expected that transplants from the runners on the mother plants will be used to fill in the gaps on most varieties in 2001. Both Kent and Toklat will have to be re-ordered as their numbers were to low for meaningful comparison.

Strawberries surrounded by the IRT mulch

Table 11
Strawberry Survival – Assessments

Variety	Alive/Planted July 21, 2000	Percent Alive	Comments, July 21	Comments, Aug 31
Cavendish #1	56 / 56	100	Healthiest variety, flowering and producing fruit	Still best variety in vigour, good runner development on 90% of the plants
Cavendish #2	46 / 56	82		
Bounty	52 / 56	93	2nd in vigour, more flowers than Cavendish and smaller fruit	As good in vigour as Cavendish, 70% runner development
Honeyeye #1	46 / 56	82	Earliest fruiting, some sap bettle damage on fruit	Not as vigourous as first two varieties
Honeyeye #2	17 / 56	30	Less transplant success	50% runner development
Goosclap #1	56 / 56	100	Not as good growth as Cavendish	Still producing fruit, not as sweet as other varieties
Goosclap #2	54 / 56	96	Flowering with immature fruit	10% runner development, reasonably vigourous
Kent #1	15 / 56	27	Heavy transplanting losses	Those that survived are making a comeback
Kent #2	15 / 56	27	Same as above	10% runner development
Kent #3	29 / 56	52	Same as above	Same as above
Toklat	½ row / ½ row	100	Later transplants from Zgeb's garden	Stock from Alaska did not arrive

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Useful Internet References

Alberta Agriculture
http://www.agric.gov.ab.ca

Agriculture and Agri-Food Canada
http://www.agr.ca

University of Alaska Fairbanks
http://www.lter.uaf.edu

Appendix A

Potato Variety Descriptions

Norland – Released in 1957, this variety was developed by the North Dakota State University. Tuber shape is medium oblong with shallow eyes on a smooth, red skin with a white flesh. Plant is medium large with purple flowers. Maturity is early mid-season, storable rating is good.

Norland potato crop

Appendix B

Grain Variety Descriptions

Barley – AC Albright – Developed in 1992 by Agriculture Canada at the Beaverlodge Research Farm. AC Albright is a six-row, general purpose feed barley. The strengths of this barley are that it is slightly higher yielding than Otal and has good kernel weathering ability at harvest. Weaknesses are a shallow root system susceptible to root rot, and a straw strength equal to Otal. This variety is distributed by SeCan and Alberta Seed Growers.

Barley – Otal – Developed in 1981 by the USDA-ARS in Alaska. It is a six-row, feed barley. Tests in Alaska yielded 72-77 bushels/acre.

Oats – AC Mustang – Developed in 1994 by Agriculture Canada at the Lacombe Research Centre and Beaverlodge Research Farm. It is a feed/silage oat. Strengths of this variety are yields 5-7% more than Cascade, good silage yield, lodging resistance and test weight. It has a high percent plump kernels and low percent thin kernels. Weaknesses are it has a high hull content - not a milling oat and is susceptible to crown and stem rust. Distributed by Agricore and Alberta Seed Growers.

Wheat – AC Minto – Developed in 1991 by the Cereal Research Centre in Winnipeg, Manitoba. It is a Hard Red Spring Wheat. Strengths of the grain are very good leaf and stem rust resistance, high yield, larger seed size, and good loose smut and bunt resistance. It is similar to Neepawa and Katepwa, but one half day later in maturity and taller with no straw strength improvement. This seed is distributed by SeCan.

Wheat – Roblin – Developed in 1986 at the Cereal Research Centre in Winnipeg, Manitoba. It is a Hard Red Spring Wheat. Strengths of the grain are early maturity combined with good yields, strong straw, good rust resistance, and high protein. The weaknesses are susceptibility to common bunt, common root rot, and septoria leaf blotch. This seed is distributed by SeCan.

Takhini Forestry Farm Demonstration Plot

Appendix C

Raspberry Variety Descriptions

Boyne – Developed at the Agriculture Canada Research Station at Morden, Manitoba and introduced in 1960, it is a combination of Chief and Indian Summer. It is the hardiest and most consistently productive cultivar for the Prairies; and the main cultivar for commercial production in all colder regions of Canada and the United States. Canes are medium in height, thick, erect and stocky, with many lateral branches. Fruit is medium sized, dark red, firm, juicy, aromatic and tart. It has very good dessert quality, good frozen quality and is excellent for processing and canning.

Double Delight – Developed by Agriculture Canada Research Station, Morden Manitoba, it is a combination of Fall Red, native primocane fruiting type, Cheyenne, Wyoming, Fall Red, and Boyne. Double Delight canes are stout with sparse, short spines and grow to a height of 5 feet. The medium red berries are sweet, tart and excellent.

Honey Queen – Introduced by Robert Erskine from Alberta's Rocky Mountain House in the mid-sixties. It is the hardiest of the yellow raspberries. It has good-sized, aromatic berries that have a mild but entirely different flavour than the red berries. The berries are considered soft, and poorly suited to freezing and processing, but are excellent fresh.

Kiska – Developed by Dr. Arvo Kallio at the Agricultural and Forestry Experiment Station, Fairbanks Alaska. Kiska raspberries have thin, willowy canes. Under optimum fertility and moisture, canes may easily reach 6-8 feet in height. These canes tend to bend outward and downward making harvesting difficult.

Red River – Selected in 1978 at the Agriculture Canada Research Station, Morden Manitoba, it is a combination of Fall Red, native primocane fruiting type, Cheyenne, Wyoming, Fall Red, and Boyne. Red River fruits earlier than other selections tested. It has medium red berries that are sweet, tart and good. Canes are relatively short and stout with sparse short spines, and grow to a height of 3.5 feet.

Souris – Developed by Agriculture Canada Research Station, Morden Manitoba. An improved selection of Boyne because it is better tasting, a heavier producer of fruit and it has 15% better spider mite resistance.

SK Red Mammoth – Developed by the Department of Plant Science at the University of Saskatchewan, it is a variant of Muskoka. It is a large-fruited, red raspberry with yields similar to Boyne, but with longer shelf life.

SK Red Bounty – Developed by the Department of Plant Science at the University of Saskatchewan, it is a combination of Trent and Fraser. It is superior to Boyne in both yeild and winter hardiness. The berries show good resistance to skin injury.

Appendix D

Strawberry Variety Descriptions

Bounty – Developed in 1972 by Agriculture Canada, it is a cross between Jerseybelle and Senga Sengana. Produces medium to high yields of dark red berries which have a very good flavour when fully ripe. King berries are large but size drops quickly for later fruit. Berries are medium firm and hull easily. Plants are susceptible to red stele (caused by the fungus *Phytophthora fragariae*) and green petal. Makes a jam with excellent flavour. Suited to Pick Your Own (PYO).

Cavendish – Developed by Agriculture Canada in 1990, it is a cross between Glooscap and Annapolis. This variety produces high yields of very large, medium firm to firm fruit. Flavour is good but berries are prone to excessive darkening when overripe and colour can be variable with white blotches evident under some conditions. Plants show low to medium vigour so planting densities should be increased. Resistant to red stele (A-6) but susceptible to powdery mildew and green petal. Suited to PYO or limited shipping.

Gooscap – Developed by Agriculture Canada in 1983, it is a cross between Micmac and Bounty. Produces high yields of medium to large, dark red fruit. Berries are medium firm with good flavour. Plants are vigorous and winter hardy. Susceptible to red stele (A-6) and green petal. Suited to PYO. Symptoms resembling June Yellows have been observed.

Honeyoye – Developed in 1972 by the New York State Agricultural Experiment Station, it is a cross between Vibrant and Holiday. Produces high yields of medium to large, attractive, medium firm berries which are prone to excessive darkening when overripe. Green tip may be observed, particularly on king berries. Honeoye produces ample pollen and has some tolerance to tarnished plant bugs and thereby consistently develops well formed fruit. Fruit flavour is variable and can be quite acid on some sites. Plants are vigorous and they runner well.

Kent – Developed by Agriculture Canada it is a cross between Redgauntlet, Tioga and Raritan. Produces very high yields of large, bright red fruit. Berry flesh is firm but skin may be weak in hot weather. Flavour is fair to good. Has shown some tolerance to red stele (A-6) in some fields. Suited to PYO and limited shipping. Kent is the most widely grown strawberry variety in eastern Canada.

Toklat – Developed in the 1960s by Arvo Kallio at the University of Alaska Experimental Station. It is a recommended perennial "June bearing" strawberry plant which are July-bearing in Fairbanks, Alaska for about two weeks. The strawberry will die if the temperature dips below –6.5°C, but a covering of snow will usually help insulate the plant. Other virtues of the perennial Toklat are its large size, firmness and pleasingly red hue. Toklats produce a lot of runners, which may sound like a good thing, but sometimes isn't, because if a plant is spending energy making runners, it has less energy to make fruit.